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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,563	11/28/2003	Naoki Yoshimura	PTGF-03095	6265
21254	7590	02/10/2005	EXAMINER	
MCGINN & GIBB, PLLC 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817			MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/722,563

Applicant(s)

YOSHIMURA ET AL.

Examiner

Johannes P. Mondt

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-16 and 18-26 is/are rejected.
- 7) ☒ Claim(s) 12 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/2/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Species 1 in the reply filed on 12/16/2004 is acknowledged.

### *Information Disclosure Statement*

The examiner has considered the items listed in the Information Disclosure Statement filed 09/02/2004. A signed copy of Form PTO-1449 is herewith enclosed.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. **Claims 6-8** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6, and through their dependence on claim 6, claims 7-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite through the omission of essential elements, such omission amounting to a gap between the elements. The omitted elements are caused by the entirely undefined and undetermined ranges for at least one of the variables x, y, z, m and n, rendering the claim limitations of lines 3-10 of claim 6 implausible. See MPEP § 2172.01.
4. **Claim 13** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the claimed subject matter is partly contained in

Art Unit: 2826

brackets which may be interpreted as denoting a non-committal portion of the claim language. See MPEP 2173.05(d).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. ***Claims 1-11, 14-16 and 18*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (6,670,748 B2). With regard to claims 6-8 this rejection is offered subject to the aforementioned indefiniteness of claims 6-8 and to the best of understanding of the examiner.

On claims 1, 3 and 14: *Ellens et al* teach a light emitting apparatus comprising: a light emitting element (cf. title and abstract) with an emission wavelength in the range of 300 to 570 nm, hence a range overlapping the range as claimed, i.e., 360 to 550 nm (cf. abstract); and a rare-earth element doped oxide nitride phosphor (cf. col. 1, l. 39 – col. 4, l. 5, for instance col. 3, l. 59-64, the rare-earth element being Eu (also at least Ce (thus meeting claim 14), Lu, La, Gd), and including an  $\alpha$ -sialon (cf. col. 1, l. 28-36 and col. 3, l. 59-64) (thus meeting the further limitation of claim 3); wherein part of the light radiated from the light emitting element is wavelength-converted by the phosphor to the wavelength range with peak emission at 430 to 670 nm for example: see abstract. In conclusion, Ellens et al teach all limitations except possibly the range for the emission wavelength of the LED, said range seen to overlap the range taught by the prior art.

Art Unit: 2826

Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 2: the emission wavelength range as claimed, 450 – 550 nm, overlaps the range in the prior art (300-570 nm). Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 4: the phosphor is in the form of powder 6 or particles (cf. col. 7, l. 50-60) and is contained in a light transmitting material 5 (Figure 1 and col. 6, l. 55 – col. 7, l. 7).

On claim 5: the light emitting element is a III Group (Group III, i.e.) nitride system compound semiconductor emitting element (InGaN: cf. col. 6, l. 56-64).

On claims 6 and 11: the alpha sialon phosphor by Ellens et al is  $\text{Me}_x\text{Si}_{12-(m+n)}\text{Al}_{(m+n)}\text{O}_n\text{N}_{16-n}:\text{Re}_1\text{Re}_2$ , with part or all of metal Me (=one or more of Li, Ca, Mg, Y and lanthanide metals except La and Ce replaced by lanthanide metal Re1 (one or more of Ce, Pr, Eu, Tb, Yb, and Er), as luminescence center, or replaced by lanthanide metal (Re1) and lanthanide metal (Re2), where Re2 is Dy, co-activator. In particular the claim is met for  $\text{M}_{p/2}\text{Si}_{12-(p+q)}\text{Al}_{p+q}\text{O}_q\text{N}_{16-q}:\text{Eu}^{2+}$  (cf. col. 3, l. 59-64, Table 2, col. 5, l. 29-col. 6, l. 28 and col. 8, l. 34-53) and the selections  $x=p/2$ ,  $n=q$ ,  $p=m$ , the selection Ca

Art Unit: 2826

(thus meeting claim 11) for metal Me, the selection of Eu for Re1, considering Re2 need not be present. For example, specifically note  $\text{Ca}_{0.68}\text{Si}_{10}\text{Al}_2\text{N}_{15.3}\text{O}_{0.7}$ :  $\text{Eu}^{2+}$  which meets the claim through the selections of Ca for Me,  $x=0.68$ ,  $m+n=2$ ,  $n=0.7$ ,  $m=1.3$ , and Re1=Eu and Re2 absent. It is furthermore noted that the chemical expression merely defines  $\alpha$ -sialon when doped with Re1 and/or Re2.

On claim 7: the metal Me=Ca (Ca is bivalent, being in Group IIA of the periodic system and having two electrons in the outer shell) and the values  $m=1.3$  and  $n=0.7$  discussed above under claim 6 meet the further limitation of this claim.

On claim 8: the further limitation of claim 8 is met by  $\text{MSi}_5\text{Al}_2\text{ON}_9$ :  $\text{Eu}^{2+}$  (col. 8, l. 34-53) where M is one of the trivalent elements Lu, La, Gd or Y,  $m=1.98$  and  $n=1.45$  ( $12-(m+n)=2.5(m+n)$  so as to have the correct ratio between the Si and Al, and  $16-n=9n$  so as to have the correct ratio between O and N). Note that only ratios of stoichiometric parameters matter considering the powder form of the substance.

On claims 9 and 10: Ellens et al do not necessarily teach the further limitation as defined by claim 9, nor as defined by claim 10. However, despite the point-like nature of said limitation with regard to the required ratios of Si, Al, O and N Applicants do not at all disclose in their Specification, at least not within the context of elected Species 1, why said claimed range is critical to their invention. Applicant's disclosure does not teach why the range as claimed is critical to the invention, in particular not why *the difference in the range as claimed and any of the phosphors taught by Ellens et al, is critical to their invention*, and, most particularly, Applicants do not even state what the *tolerance* of the stated values for n and m in the range limitation is. In view of the

Art Unit: 2826

absence of a teaching why a range is critical to the invention Applicant is reminded that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 15: Ellens et al also teach the light emitting apparatus wherein the phosphor is represented by  $\text{La}_{1-x}\text{Si}_3\text{N}_5:\text{Ce}_x$ , where  $0 < x < 1$  and the cerium ion is doped to the lanthanum site in solid dissolution replacement (of the lanthanum ion) (cf. col. 2, l. 6-64, specifically, l. 64, with  $x=0.5$ ). In this regard the objection to claim 15 is noted above.

On claim 16: the doping amount is  $x=0.5$ , which is a limit point of the claimed range  $0.1 < x < 0.5$ , and therefore the phosphor also is an ultraviolet ray excitation phosphor, differing from the prior art only by an infinitesimal amount (amount smaller than any given positive amount). In this regard Applicant is reminded that it has been held that a *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art or when the ranges of a claimed composition do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 18: the phosphor by Ellens radiates daylight and hence also blue light, blue light being part of daylight (cf. col. 1, l. 49 – col. 2, l. 64).

7. **Claims 19, 21, 23 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (6,670,748 B2) in view of Lebens et al (6,095,661). Ellens et al teach a light emitting method for a light emitting apparatus that comprises a light

Art Unit: 2826

emitting element (cf. title and abstract) with an emission wavelength in the range of 300 to 570 nm, hence a range overlapping the range as claimed in claims 19 and 23 (cf. abstract); and a rare– earth element doped oxide nitride phosphor (cf. col. 1, l. 39 – col. 4, l. 5, for instance col. 3, l. 41) including the rare-earth element Ce (cf. especially col. 3, l. 41), wherein part of the light radiated from the light emitting element is wavelength-converted by the phosphor so that the light-emitting element radiates light generated by a mixture of wavelength-converted light and the other part of light from the light emitting element (to the wavelength range with peak emission at 430 to 670 nm for example: see abstract). In conclusion, Ellens et al teach all limitations except possibly the two following limitations:

(a) the range for the emission wavelength, said range seen to overlap the range taught by the prior art. However, Applicants are reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003);

(b) the turning on intermittently the light emitting element. However, it would have been obvious to include limitation ad (b) in view of Lebens et al (see final sentence in abstract, Figure 9 and col. 13, l. 15-40), who teach the selective application of power to LEDs of InGaN (hence analogous art) thus making use of the temperature-dependent color spectrum of said LED to control the spectrum (hence meeting claim 21).

*Motivation* to include the teaching by Lebens et al thus derives from the added control of the light spectrum.

On claim 25: the light element is a Group III nitride system compound semiconductor light emitting element (InGaN) (cf. Best Mode for Carrying out the Invention in Ellens et al).

8. **Claims 20, 22, 24 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (6,670,748 B2) in view of Lebens et al (6,095,661). Ellens et al teach a light emitting method for a light emitting apparatus that comprises a light emitting element (cf. title and abstract) with an emission wavelength in the range of 300 to 570 nm, hence a range overlapping the range as claimed in claim 20 as well as in claim 24, i.e., the claimed ranges 360 to 550 nm and 450-550 nm (cf. abstract); and a lanthanum silicon nitride phosphor (cf. col. 1, l. 39 – col. 4, l. 5, for instance col. 3, l. 41) including the rare-earth element Ce (cf. especially col. 2, l. 64), wherein part of the light radiated from the light emitting element is wavelength-converted by the phosphor so that the light-emitting element radiates light generated by a mixture of wavelength-converted light and the other part of light from the light emitting element (to the wavelength range with peak emission at 430 to 670 nm for example: see abstract). In conclusion, Ellens et al teach all limitations except possibly the two following limitations:

(a) the range for the emission wavelength, said range seen to overlap the range taught by the prior art. However, Applicants are reminded that a *prima facie* case of obviousness typically exists when the ranges as claimed overlap the ranges disclosed in the prior art or when the ranges do not overlap but are close enough such that one

Art Unit: 2826

skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003);

(b) the turning on intermittently the light emitting element. However, it would have been obvious to include limitation ad (b) in view of Lebens et al (see final sentence in abstract, Figure 9 and col. 13, l. 15-40), who teach the selective application of power to LEDs of InGaN (hence analogous art) thus making use of the temperature-dependent color spectrum of said LED to control the spectrum (col. 13, l. 15-40; hence meeting claim 22). *Motivation* to include the teaching by Lebens et al thus derives from the added control of the light spectrum.

On claim 26: the light element is a Group III nitride system compound semiconductor light emitting element (InGaN) (cf. Best Mode for Carrying out the Invention in Ellens et al).

### ***Allowable Subject Matter***

9. **Claim 12** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The further limitation of claim 12, within the strict context of the invention as claimed by claim 1, has not been found in the prior art.

10. **Claim 17** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The further limitation of claim 17, within the strict context of the invention as claimed by claim 14, has not been found in the prior art.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

*R.-J. Xie et al*, "Preparation and Luminescence Spectra of Calcium- and Rare-Earth (R= Eu, Tb, and Pr) – Codoped  $\alpha$ -SiAlON Ceramics", J. Am. Ceram. Soc., Volume 85, Issue 5, pp. 1229-1234, published in May 2002.

*J.W.H. van Krevel et al*, "Luminescence Properties of Terbium-, Cerium-, or Europium- Doped  $\alpha$ -Sialon Materials", Journal of Solid State Chemistry, Volume 165, Issue 1, 19-24 (April 2002).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM  
February 6, 2005

Patent Examiner:

A handwritten signature in black ink, appearing to read 'Johannes Mondt', with a stylized flourish at the end.

Johannes Mondt (Art Unit: 2826)